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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/811,465	03/20/2001	Yuichi Takano	08372.0002	7960

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EXAMINER

HASSANZADEH, PARVIZ

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/21/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/811,465	<b>Applicant(s)</b> TAKANO ET AL.	
	<b>Examiner</b> Parviz Hassanzadeh	<b>Art Unit</b> 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 04 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____        |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input checked="" type="checkbox"/> Other: <i>approved proposed drawings</i> . |

## DETAILED ACTION

### *Drawings*

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 3/4/03 have been approved by the Examiner. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US Patent No. 6,497,783 B1) in view of Nagahama et al (JP 11-228172 A).**

Suzuki et al teach a plasma processing apparatus (Fig. 2) including a microwave applicator 3 (*cover and antenna*) disposed on a dielectric window 4 (*glass component*), wherein

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the applicator 3 having a plurality of slots 3b (*a cover component including a plurality of openings, into which said glass component is fitted, and an antenna fixed to said cover component*) for uniform distribution of microwave (column 6, line 52 through column 7, line 7). The dielectric material may comprise quartz, alumina or the like (column 11, lines 41-64).

Suzuki et al fail to teach the dielectric being made of a glass comprising a first phase comprising (consisting essentially of) Si and O and a second phase comprising (consisting essentially of) Si, Al and O wherein the second phase has 0.1-10 parts aluminum-containing oxide powder added to 100 parts quartz powder.

Nagahama et al teach a glass comprising (consisting essentially of) SiO<sub>2</sub> as the main component and incorporated therein 0.01-10 atomic % Al which has high resistance to plasma corrosion (abstract, paragraphs 0010-0020).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the glass material as taught by Nagahama et al in the microwave transmitting window of Suzuki et al in order to render the microwave transmitting window more resistance to plasma corrosion.

Furthermore, modification of the applicator such that the dielectric window is fitted thereinto is considered change in shape with no significant effect. It was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

**Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (US Patent No. 6,497,783 B1) in view of Rittler (US Patent No. 4,009,042) and Prochazka (US Patent No. 4,266,978).**

Suzuki et al teach a plasma processing apparatus (Fig. 2) including a microwave applicator 3 (*cover and antenna*) disposed on a dielectric window 4 (*glass component*), wherein the applicator 3 having a plurality of slots 3b (*a cover component including a plurality of openings, into which said glass component is fitted, and an antenna fixed to said cover component*) for uniform distribution of microwave (column 6, line 52 through column 7, line 7). The dielectric material may comprise quartz, alumina or the like (column 11, lines 41-64).

Suzuki et al fail to teach the dielectric being made of a glass comprising a first phase comprising (consisting essentially of) Si and O and a second phase comprising (consisting essentially of) Si, Al and O wherein the second phase has 0.1-10 parts aluminum-containing oxide powder added to 100 parts quartz powder.

Rittler teaches a glass-ceramics comprising (consisting essentially of) 50-65% quartz ( $\text{SiO}_2$ ) and 20-30% alumina ( $\text{Al}_2\text{O}_3$ ) as the major components of a predominant beta-phase as shown in Table 1 in order to obtain a transparent glass-ceramics with low coefficient of expansion and good transparency (abstract and column 7, line 34 through column 8, line 34).

Prochazka teaches a glass-ceramics (mullite) comprising (consisting essentially of) quartz ( $\text{SiO}_2$ ) and alumina ( $\text{Al}_2\text{O}_3$ ) wherein when the ratio of the components change separate mineral phases are produced (column 2, lines 39-64).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the glass material as taught by Rittler and Prochazka in the microwave

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transmitting window of Suzuki et al as an art recognized equivalent alternative for the microwave transmitting window which has a lower thermal coefficient and higher resistance to plasma corrosion.

See MPEP 2144.06, Art Recognized Equivalent for the Same Purpose, Substituting Equivalents Known for the Same Purpose (*in re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982)).

Furthermore, modification of the applicator such that the dielectric window is fitted thereinto is considered change in shape with no significant effect. It was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

#### ***Response to Arguments***

Applicant's arguments with respect to claims 4-7 have been considered but are moot in view of the new ground(s) of rejection.

Applicants assert that Mabuchi et al do not teach "a cover component including a plurality of openings, into which said glass component is fitted, and an antenna fixed to said cover component".

The Examiner argues that substitution of the microwave antenna (cover plate 32) of Mabuchi et al which has a single large opening and covering the microwave introducing window (dielectric component 32) with an antenna member having a plurality of openings is considered to have been obvious to one of ordinary skill in the art at the time of the invention for further distribution of microwave energy one the sample to be processed. However, in the present

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rejection, Suzuki et al has utilized for teaching a conventional microwave applicator having a plurality of openings and wherein the applicator is disposed upon a dielectric window (glass component).

Applicants further assert that Rittler do not teach "a glass 0.1-10 parts aluminum-containing oxide powder added to 100 parts quartz powder".

The Examiner argues that Rittler teaches a glass-ceramic comprising 50-65% quartz ( $\text{SiO}_2$ ) and 20-30% alumina ( $\text{Al}_2\text{O}_3$ ), and Prochazka teaches that the ratio of quartz to alumina in a glass-ceramics affect the mineral phases produced in the mixture. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the ratio of alumina to quartz to obtain a dielectric window suitable for (resistant to) plasma processing environment.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

*Prochazka et al (US Patent No. 4,427,785)* teach an optically translucent ceramic comprising SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> (abstract);

*Otoshi et al (US Patent No. 5,637,358)* teach a microwave window 102 including a movable dielectric sheet 121 made of ceramics containing aluminum oxide or/and silicon oxide (column 5, lines 57-67);

*Matsumoto (US Patent No. 6,358,361 B1)* teach a plasma processing apparatus including an applicator having a plurality of openings; and

*Matsumoto et al (US Patent No. 6,290,807 B1)* teach a plasma processing apparatus including an applicator having a plurality of openings and wherein a microwave transmitting window is fitted into the applicator.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

*P. Hassanzadeh*  
Parviz Hassanzadeh  
Examiner  
Art Unit 1763

March 25, 2003